

Claims

1. A well treatment fluid composition, comprising a carrier fluid, a viscosifying agent, an amphoteric surfactant, and proppant, wherein the surfactant comprises an alkyl-aminocarboxylic acid or carboxylate.
- 5 2. The composition of claim 1, wherein the composition is a foam that comprises a gas selected from the group consisting of nitrogen, air, and carbon dioxide.
3. The composition of claim 1, wherein the surfactant has the formula
$$R-\text{NH}_2-(\text{CH}_2)_n-\text{C}(\text{O})\text{OX}$$
 wherein R is a saturated or unsaturated alkyl group having from 6-20 carbon atoms, n is from 2-6, and X is hydrogen or a salt forming cation.
- 10 4. The composition of claim 3, wherein n is from 2-4.
5. The composition of claim 3, wherein R is a saturated or unsaturated alkyl group having from 10-14 carbon atoms.
6. The composition of claim 1, wherein the surfactant comprises an alkyl-aminopropionic acid or propionate.
- 15 7. The composition of claim 1, wherein the surfactant is a coco-aminopropionate.
8. The composition of claim 1, wherein the viscosifying agent is a solvatable, crosslinkable polymer selected from the group consisting of guar, hydroxypropyl guar, carboxymethyl guar, carboxymethylhydroxypropyl guar, hydroxyethyl cellulose, carboxymethylhydroxyethyl cellulose, hydroxypropyl cellulose, xanthan, and mixtures thereof.
- 20 9. The composition of claim 8, further comprising a crosslinking agent.
10. The composition of claim 8, further comprising a gel breaker for the viscosifying agent.
11. The composition of claim 10, further comprising a breaker aid.
- 25 12. The composition of claim 1, further comprising an additive that decreases the frictional pressure involved in pumping the fluid composition through well tubing.

13. The composition of claim 12, wherein the additive comprises at least one polyacrylamide.
14. A well treatment fluid composition, comprising a carrier fluid; a viscosifying agent selected from the group consisting of guar, hydroxypropyl guar, carboxymethyl guar, carboxymethylhydroxypropyl guar, hydroxyethyl cellulose, carboxymethylhydroxyethyl cellulose, hydroxypropyl cellulose, xanthan, and mixtures thereof; a coco-aminopropionate surfactant; and proppant.
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15. A method of hydraulically fracturing a subterranean coal bed, comprising the step of injecting a well treatment fluid composition via a wellbore into a subterranean coal bed at a flow rate and pressure sufficient to hydraulically fracture the formation, wherein the well treatment fluid composition comprises a carrier fluid and an amphoteric surfactant.
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16. The method of claim 15, wherein the well treatment fluid further comprises proppant.
17. The method of claim 15, wherein the well treatment fluid further comprises a viscosifying agent.
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18. The method of claim 15, wherein the composition is a foam that comprises a gas selected from the group consisting of nitrogen, air, and carbon dioxide.
19. The method of claim 15, further comprising injecting carbon dioxide via the wellbore into the subterranean bed prior to injecting the well treatment fluid composition.
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20. The method of claim 15, wherein the surfactant comprises an alkyl-aminocarboxylic acid or carboxylate.
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21. The method of claim 15, wherein the surfactant has the formula $\text{RNH}_2(\text{CH}_2)_n\text{C}(\text{O})\text{OX}$ wherein R is a saturated or unsaturated alkyl group having from 6-20 carbon atoms, n is from 2-6, and X is hydrogen or a salt forming cation.
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22. The method of claim 21, wherein n is from 2-4.
23. The method of claim 21, wherein R is a saturated or unsaturated alkyl group having from 10-14 carbon atoms.

24. The method of claim 15, wherein the surfactant comprises an alkyl-aminopropionic acid or propionate.
25. The method of claim 15, wherein the surfactant is a coco-aminopropionate.
26. The method of claim 17, wherein the viscosifying agent is a solvatable, crosslinkable polymer selected from the group consisting of guar, hydroxypropyl guar, carboxymethyl guar, carboxymethylhydroxypropyl guar, hydroxyethyl cellulose, carboxymethylhydroxyethyl cellulose, hydroxypropyl cellulose, xanthan, and mixtures thereof.
27. The method of claim 26, further comprising a crosslinking agent.
- 10 28. The method of claim 27, further comprising a gel breaker for the viscosifying agent.
29. The method of claim 28, further comprising a breaker aid.
30. The method of claim 15, further comprising an additive that decreases the frictional pressure involved in pumping the fluid composition through well tubing.
31. The method of claim 30, wherein the additive comprises at least one polyacrylamide.